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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--------------------------------|-------------|----------------------|---------------------|------------------|
| 10/797,503 | 03/10/2004 | Glen R. Fox | TI-37151 | 4009 |
| 23494 | 7590 | 06/30/2005 | EXAMINER | |
| TEXAS INSTRUMENTS INCORPORATED | | | SEFER, AHMED N | |
| P O BOX 655474, M/S 3999 | | | ART UNIT | |
| DALLAS, TX 75265 | | | PAPER NUMBER | |

2826

DATE MAILED: 06/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AKC

| | | | |
|------------------------------|--------------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/797,503 | Applicant(s) FOX ET AL. | |
| | Examiner A. Sefer | Art Unit 2826 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-10,12,14-18,20-24 and 26 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-4,6-10,12,14-18,20-24 and 26 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed April 13, 2005 has been entered and claims 5, 11, 13, 19, 25 and 27 have been cancelled.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inman et al. ("Inman") USPN 5,155,658.

Inman discloses in figs. 1-10 a semiconductor device, comprising a ferroelectric capacitor comprising a conductive lower electrode material 10 formed above a semiconductor body; a ferroelectric material 14 comprising PZT (as in claim 2) comprising a Zr content within the range recited in the claim (as in claims 7 and 8) formed above the lower electrode material, the ferroelectric material individually comprising an elongated dimension, wherein a percentage of the unit cells are oriented with elongated dimensions substantially normal to a generally planar upper surface of the semiconductor body, and wherein the percentage is within the range recited in the claim (col. 3, lines 15-32); and a conductive upper electrode material 16 formed above the ferroelectric material.

As for the recited percentage, it would have been obvious to meet the recited working ranges since it has been held that where the general conditions of a claim are disclosed in the

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prior art, discovering the optimum or working ranges involves only routine skill in the art. In *re Aller*, 105 USPQ 233. Furthermore, the specification contains no disclosure of either the critical nature of the claimed arrangement or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In *re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

4. Claims 15, 16, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inman.

Inman discloses in figs. 1-10 a ferroelectric capacitor comprising a conductive lower electrode material 10 formed above a semiconductor body; a ferroelectric material 14 comprising PZT (as in claim 16) comprising a Zr content within the range recited in the claim (as in claims 21 and 22) formed above the lower electrode material, the ferroelectric material comprising unit cells individually comprising an elongated dimension; and a conductive upper electrode material 16 formed above the ferroelectric material; wherein the upper and lower electrodes are spaced from one another along an axis, wherein a percentage of the unit cells in the ferroelectric material are oriented with elongated dimensions substantially parallel to the axis, and wherein the percentage within the range recited in the claim (col. 3, lines 15-32).

As for the recited percentage, it would have been obvious to meet the recited working ranges since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In *re Aller*, 105 USPQ 233. Furthermore, the specification contains no disclosure of either the critical nature of the claimed arrangement or any unexpected results arising therefrom. Where

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patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

5. Claims 3, 4, 6, 9, 10, 12, 14, 17, 18, 20, 23, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inman in view of Natori US PG-Pub 2004/0173826/ Sumi (JP 2003-133604).

Inman discloses the device structure as recited in the claim, but does not specifically disclose a lower electrode comprising Iridium.

Natori discloses (figs. 2, 7-12 and pars. 0067 and 0069) a ferroelectric capacitor comprising a conductive lower electrode material 312/112 comprising Iridium (as in claims 4, 10, 12, 18, 24 and 26) formed above a semiconductor body; a ferroelectric material 114 comprising PZT; and a conductive upper electrode material 116 formed above the ferroelectric material.

Similarly, Sumi discloses (fig. 3 and abstract) a ferroelectric capacitor comprising a conductive lower electrode material 42 comprising Iridium formed above a semiconductor body; a ferroelectric material 43 comprising PZT; and a conductive upper electrode material 44 formed above the ferroelectric material.

Since Inman, Natori and Sumi are all from the same field of endeavor, ferroelectric capacitors; the teaching disclosed by Natori/Sumi would have been recognized in the pertinent art of Inman. Therefore, it would have been obvious to one skilled in the art the time the invention was made to modify Inman's device by incorporating a lower electrode comprising Iridium since that would provide a high reliability ferroelectric capacitor.

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As for claims 3, 6, 9, 14, 17, 20 and 23, it would have been obvious to meet the recited working ranges since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. Furthermore, the specification contains no disclosure of either the critical nature of the claimed arrangement or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Response to Arguments

6. Applicant's arguments filed April 14, 2005 have been fully considered but they are not persuasive. The specification discloses an optimal performance with about 50-90% (page 9, lines 12-18) and that Inman's disclosure of 80-90% is evidence that ordinary workers in the field would have found the reason, suggestion and motivation to meet the recited working ranges.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Sefer whose telephone number is (571) 272-1921.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

ANS

June 20, 2005